

■ PRODUCT CHARACTERISTICS

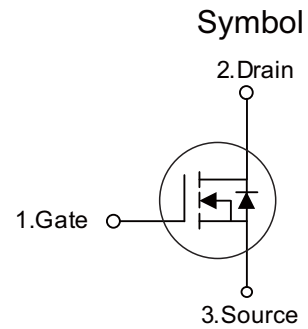
VDSS	60V
$R_{DS(on)Typ}(V_{GS}=10V)$	13mΩ
ID	50A

■ APPLICATIONS

- * Switching applications

■ FEATURES

- * High Switching Speed
- * Improved dv/dt capability



■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT50N06D	TO-252	2500 pieces /Reel
N/A	MOT50N06C	TO-251	70 pieces/Tube

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT	
Drain-Source Voltage	V_{DSS}	60	V	
Gate-Source Voltage	V_{GSS}	±20	V	
Continuous Drain Current	I_D	50	A	
Pulsed Drain Current (Note 2)	I_{DM}	150	A	
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	92	mJ
Peak Diode Recovery dv/dt	dv/dt	10	V/ns	
Power Dissipation	TO-251/TO-252	P_D	46	W
Junction Temperature	T_J	+150	°C	
Operation and Storage Temperature	T_{STG}	-55 ~ +150	°C	

- Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating : Pulse width limited by maximum junction temperature.
3. $L=43mH$, $I_{AS}=43A$, $V_{DD}=25V$, $R_G=20\Omega$, Starting $T_J=25^\circ C$
4. $I_{SD} \leq 30A$, $V_{DS}=0V$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ C$

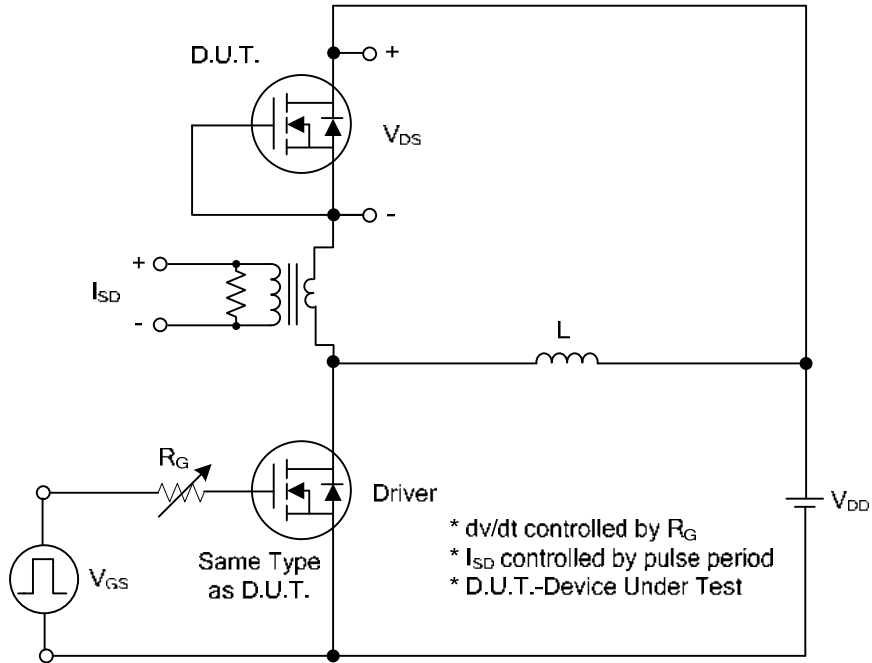
■ ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Off characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	10	μA
Gate-Source Leakage Current	Forward	$V_{GS}=20V, V_{DS}=0V$	-	-	100	nA
	Reverse		$V_{GS}=-20V, V_{DS}=0V$	-	-	-100
On characteristics						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	-	2.5	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=25A$	-	13	18	m Ω
Dynamic characteristics						
Input Capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=25V, f=1\text{MHz}$	-	2500	-	pF
Output Capacitance	C_{OSS}		-	230	-	pF
Reverse Transfer Capacitance	C_{RSS}		-	200	-	pF
Switching characteristics						
Total Gate Charge	Q_G	$V_{DS}=50V, V_{GS}=10V, I_D=1.3A$ $I_G=3\text{mA}$ (Note1,2)	-	7.2	-	nC
Gate-Source Charge	Q_{GS}		-	0.4	-	nC
Gate-Drain Charge	Q_{GD}		-	0.8	-	nC
Turn-On Delay Time	$t_{D(ON)}$	$V_{DS}=30V, V_{GS}=10V, I_D=50A,$ $R_G=25\Omega$ (Note1,2)	-	18	-	ns
Turn-On Rise Time	t_R		-	46	-	ns
Turn-Off Delay Time	$t_{D(OFF)}$		-	202	-	ns
Turn-Off Fall Time	t_F		-	116	-	ns
Drain-source diode characteristics and maximum ratings						
Maximum Continuous Drain-Source Diode Forward Current	I_S		-	-	50	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}		-	-	150	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=50A, V_{GS}=0V$	-	-	1.5	V
Body Diode Reverse Recovery Time	t_{rr}	$I_S=30A, V_{GS}=0V,$	-	50	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}	$di_S/dt=100A/\mu s$	-	80	-	nC

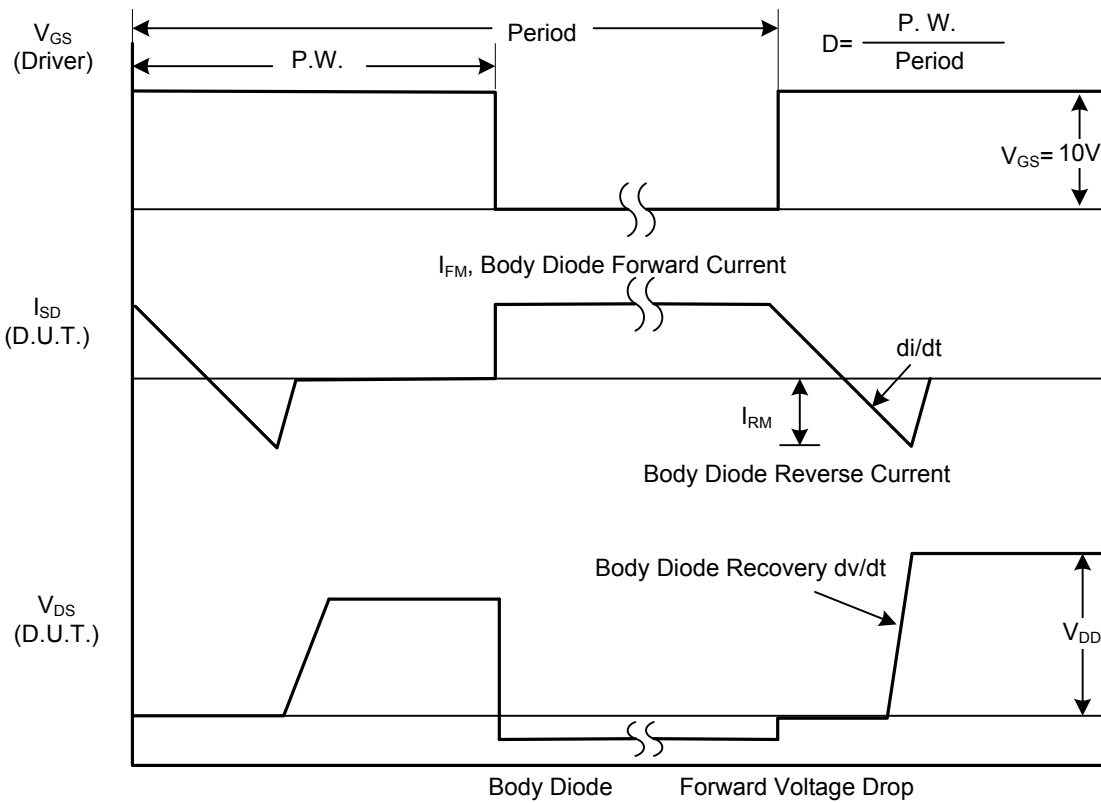
 Notes: 1. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS(Cont.)

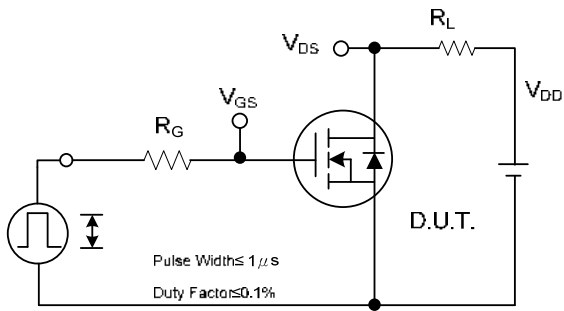


Fig. 2A Switching Test Circuit

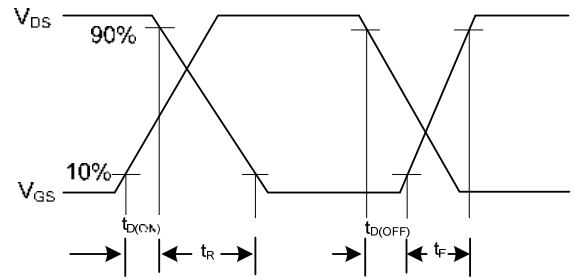


Fig. 2B Switching Waveforms

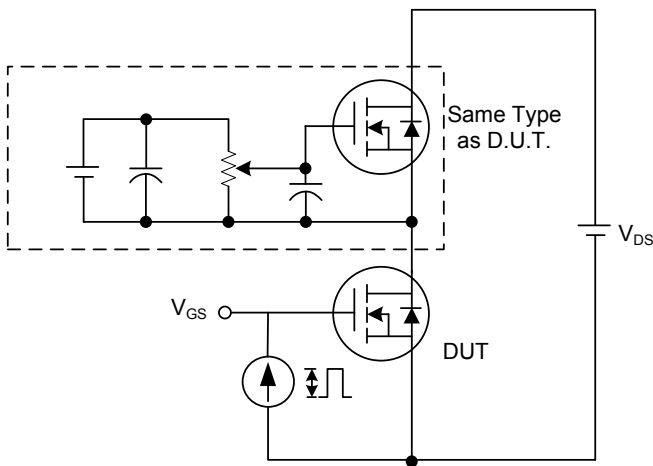


Fig. 3A Gate Charge Test Circuit

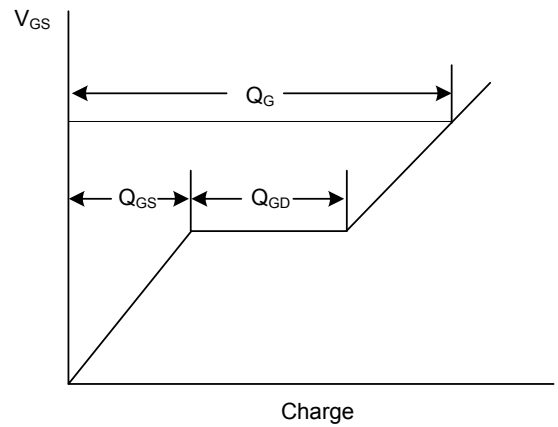


Fig. 3B Gate Charge Waveform

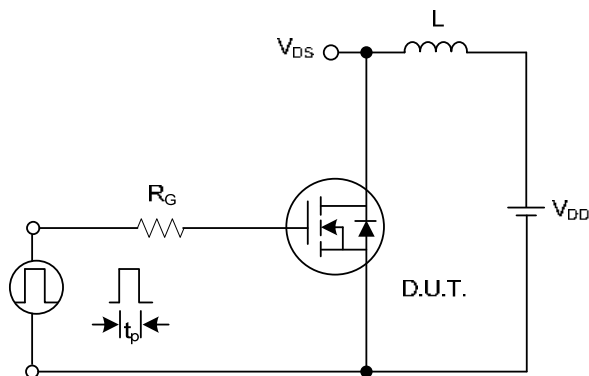


Fig. 4A Unclamped Inductive Switching Test Circuit

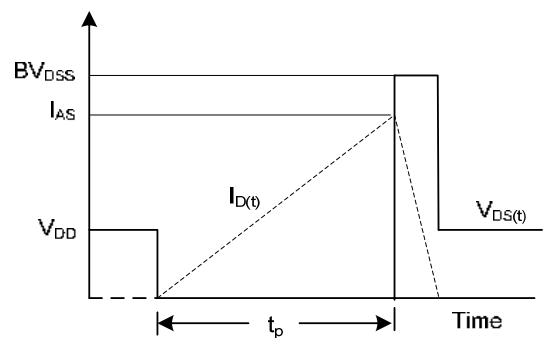
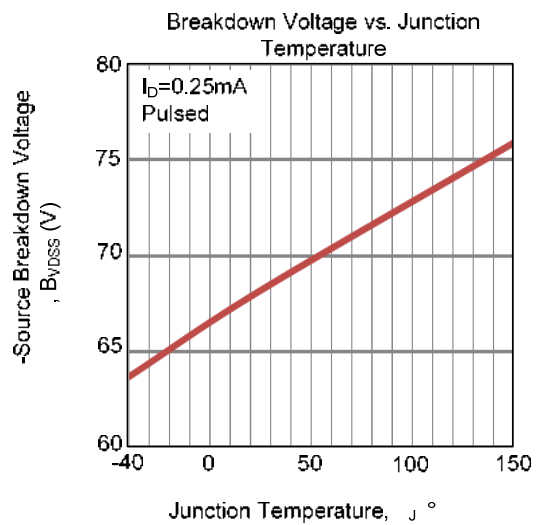
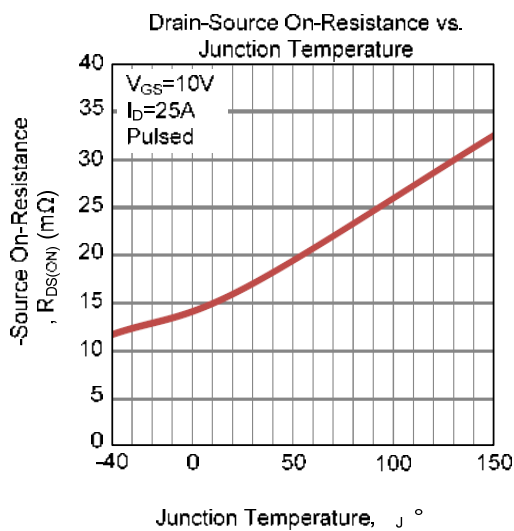
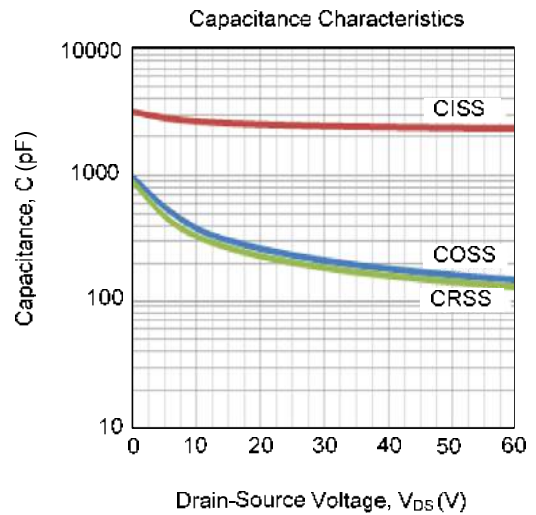
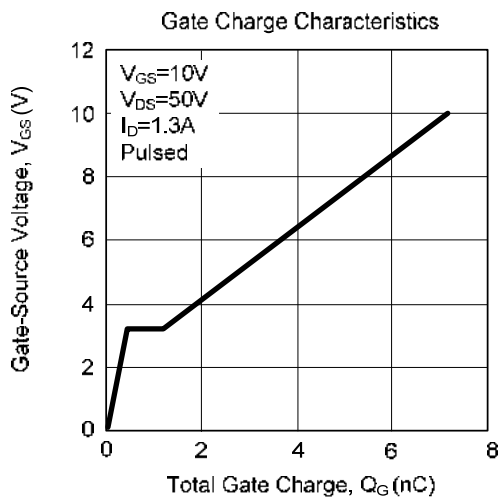
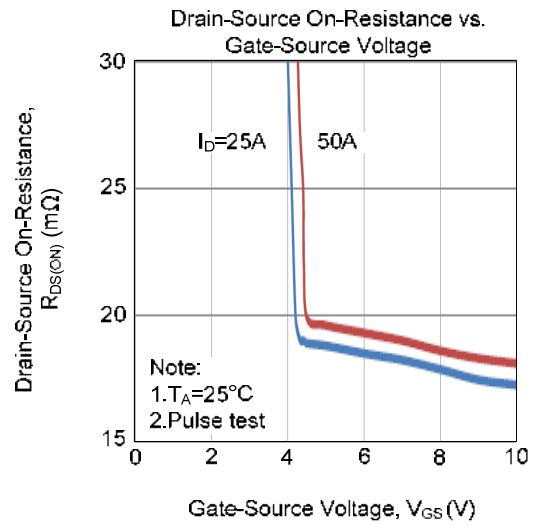
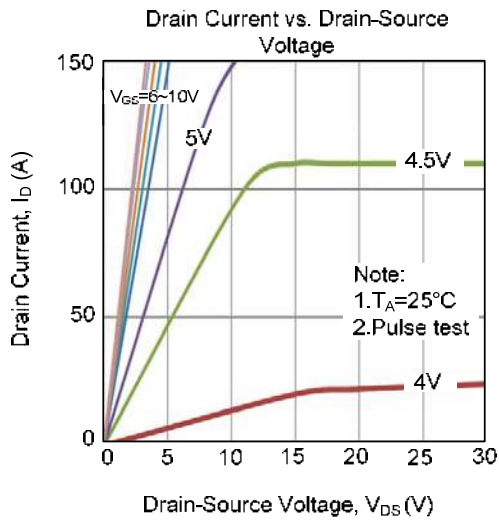
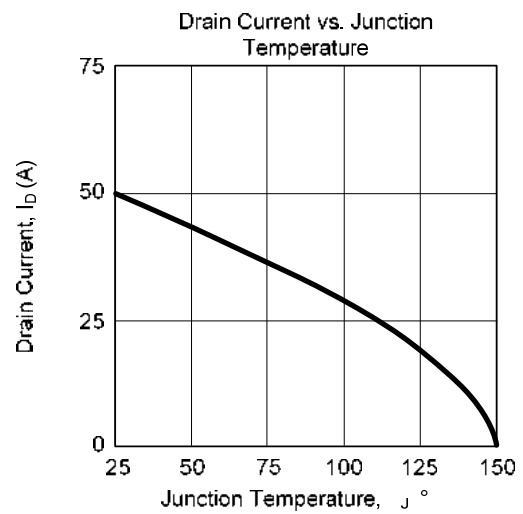
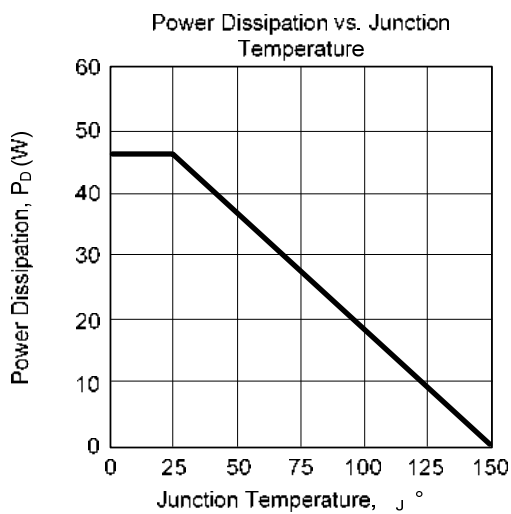
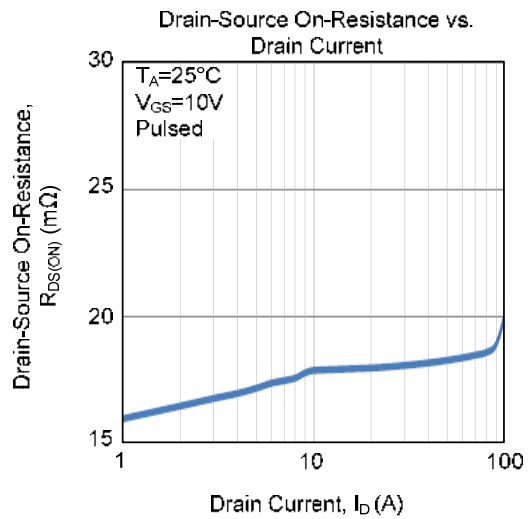
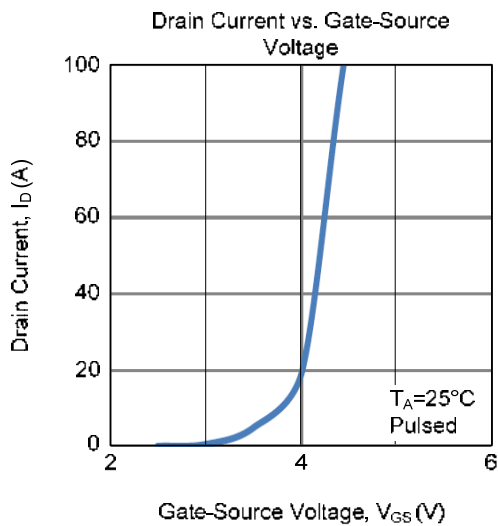
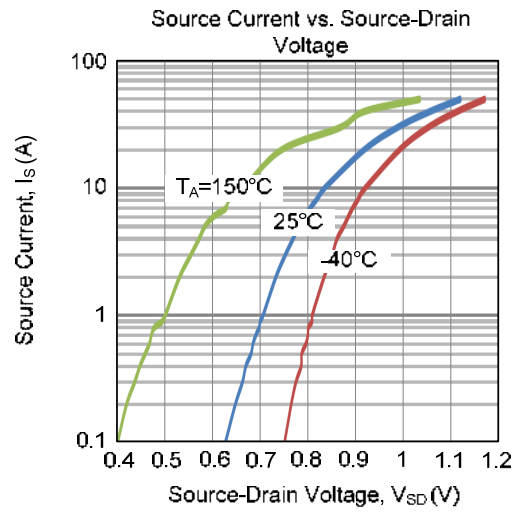
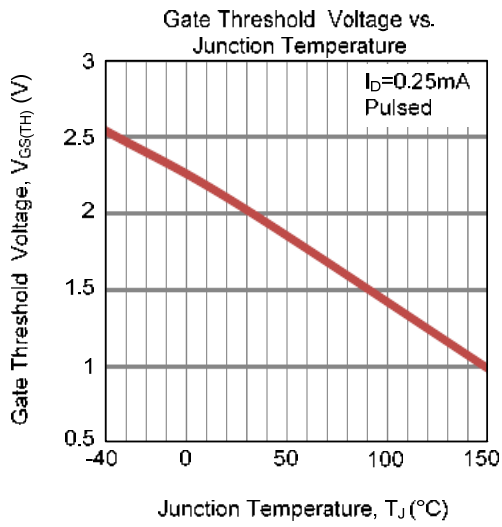


Fig. 4B Unclamped Inductive Switching Waveforms

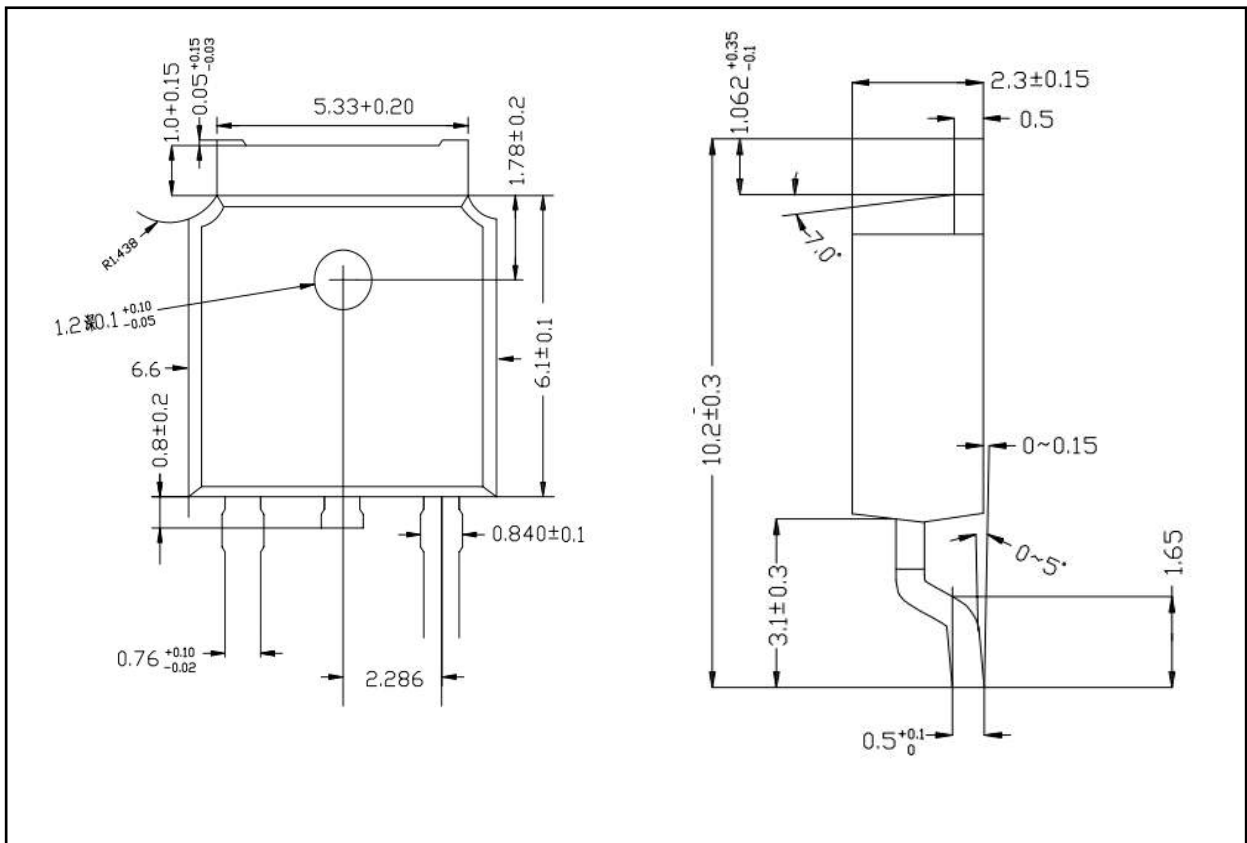
■ TYPICAL CHARACTERISTICS



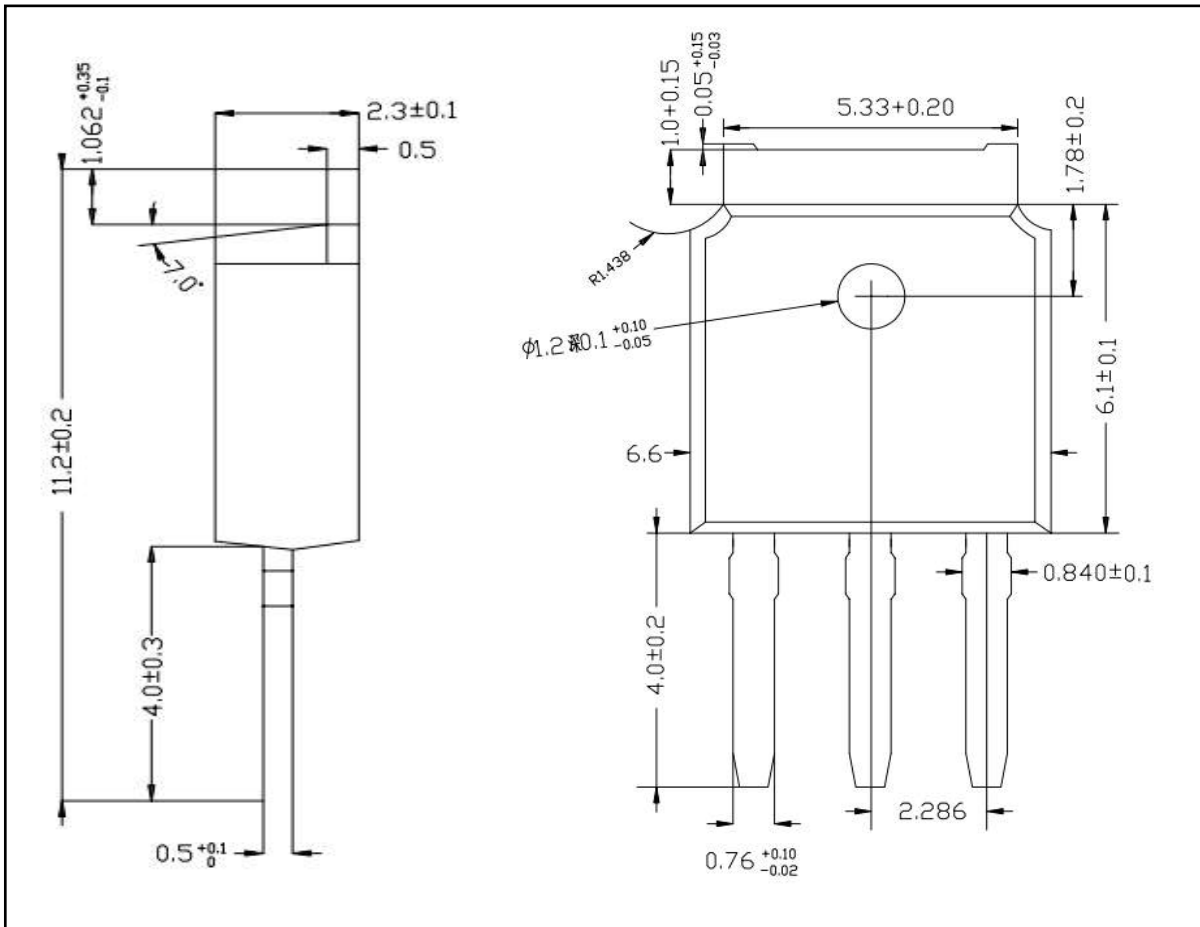
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■ TO-252 PACKAGE OUTLINE DIMENSIONS



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